# EXHIBIT 60

[redacted]

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**Summary of Qualifications**

My name is Donald I. Siegel. I am an expert in the field of hydrogeology and have been retained by the Plaintiffs in this case to analyze and provide opinions regarding Perfluorooctanoic Acid (PFOA) contamination of groundwater in North Bennington, Vermont.

I am a partner at Independent Environmental Scientists, Inc., of Manlius, New York, and also serve as Professor of Earth Sciences at Syracuse University. I earned a BS in Geology from the University of Rhode Island, an MS in Geology from Pennsylvania State University, and a PhD in Hydrogeology from the University of Minnesota. After my studies for my PhD degree, I was employed by the United States Geological Survey as a hydrologist and geochemist, after which I joined Syracuse University. There, I have taught courses at the graduate level in hydrogeology, groundwater modeling, aqueous geochemistry and contaminant hydrogeology. A copy of my C.V. is attached as Appendix “A”.

Beyond my service to Syracuse University, I have served as Chairman of the Hydrogeological Division of the Geological Society of America (GSA), which awarded me the following professional honors related to my expertise in hydrogeology and water chemistry: the Birdsall-Dreiss Distinguished Lectureship (1992-1993); GSA Distinguished Service Award (2001); and the O.E. Meinzer Award in Hydrogeology (2005).

I have also served on many National Research Council Committees (as part of the National Academy of Sciences and Engineering), and have Chaired its Water Science and Technology Board. I have served as Associate Editor of the following publications: Water Resources Research, Wetlands, Ground Water, Geology, The Hydrogeology Journal, Hydrologic Processes, and edited books for the publishing

arm of the Geological Society of America. I have published over 160 peer-reviewed research papers and books, on topics spanning the breadth of the hydrogeologic sciences, from contaminant geochemistry to wetland hydrology.

I have also been retained by governmental bodies, industry, insurance companies, and private citizens to provide my scientific expertise on a broad range of hydrogeologic issues, including contamination from solvents, hydrocarbon spills, and salt; landfill siting and contaminant characterization; water supply issues; fugitive gas and vapor intrusion problems; and wetland issues. I have been asked to testify to the U.S. Congress on wetland issues and, most recently, on hydraulic fracturing of rocks to obtain hydrocarbons.

My record of court testimony from 2012 to 2017

1. Deposition: Multiple Parties Versus Anchutz, Big Flats, New York, Federal Court, State of New York, 2014.

2. Trial testimony: State of New York, County of Cayuga, Supreme Court, Doris Baity, et. al. Plaintiffs versus General Electric, Auburn NY, April-May 2012

I reserve the right to modify this report and the professional opinions contained herein upon review of additional or supplemental information or data.

My fees are $300/hr for provided expertise in evaluating the source of PFOA in the North Bennington area, the subsurface hydrogeology and PFOA transport.

Donald Siegel, Ph.D.
Professor of Hydrogeology

## 1.0 Summary of Opinions

To a reasonable degree of scientific certainty, I conclude from review of the historic record and analysis of the sampling for PFOA in soils, sediments and groundwater that:

1. The zone of PFOA contamination designated by the State of Vermont reasonably represents the area where groundwater has been contaminated with PFOA from the operations of the former Chemfab facilities on Water Street in North Bennington, and Northside Drive in Bennington ("Saint-Gobain").

2. The air modeling of PFOA transport by Gary Yoder, of TRM (2017), is consistent with and supports the conclusion that PFOA from the Saint-Gobain facilities was distributed through the air to contaminate groundwater and water wells throughout the North Bennington area.

3. It is unlikely that the former Bennington Landfill is the source of PFOA in domestic wells near the landfill.

4. There are no other potential sources identified, other than Saint-Gobain, that credibly account for the patterns and levels of PFOA contamination throughout the zone of contamination.

5. It is likely that groundwater located in areas of Bennington/North Bennington where there are no water wells to sample is also contaminated with PFOA.

6. PFOA likely will contaminate domestic wells in the zone of contamination which have not yet been contaminated.

7. The contamination of groundwater by PFOA will persist at least for decades to more than a century.

## 2.0 PFOA Contamination in North Bennington Area

### 2.1 Location of Contamination

North Bennington is located in the north-south trending Central Vermont Valley near the southwest corner of the state (Figure 1). The undulating valley floor occurs at an elevation of about 600 – 800-feet above mean sea level, and the Green Mountains rise to an elevation of 3,000-feet to the east and the Taconic Highlands to an elevation of 2,000-feet to the west.

Beginning in March of 2016, the Vermont Department of Environmental Conservation (VT-DEC) identified an area of PFOA contamination from analyses of groundwater, surface water and sediment. The PFOA contaminated groundwater is located in an area where Saint-Gobain operated two industrial coating facilities, which used PFOA in manufacturing operations. One facility was located on Water Street in North Bennington, and the other on Northside Drive in Bennington. During operations, Saint-Gobain released PFOA to the atmosphere through industrial process emission stacks located at the two plants. The PFOA was used by Saint-Gobain in coating processes and released to the atmosphere when heated. The Northside plant closed in 1978, when operations were moved to the Water Street plant, which subsequently closed in 2001.

It has been suggested (Barr 2017) that another potential source of PFOA may be the Bennington Landfill Site. The Bennington Landfill is a United States Environmental Protection Agency (USEPA) National Priority Listed Superfund site located on the east side of the valley. Saint-Gobain reported disposing PFOA-contaminated waste into the landfill (USEPA, 1997).

The VT-DEC prepared a map defining the zone of contaminated groundwater (herein called a "plume") (Figure 2.). PFOA concentrations in groundwater are highest (over 1,000 parts per trillion (ppt)) near the Water Street plant, and decrease away in all directions to below 20 ppt. In particular, the plume extends eastward from the Water Street plant in a broad zone far to the east, crossing the Bennington Landfill and extending north and south in the Walloomsac River Valley. The testing methodologies and laboratory analyses required to be used by the VT-DEC are generally accepted in the scientific and regulatory communities.

## 2.2 Hydrogeologic Setting of North Bennington.

North Bennington is located in the Walloomsac River watershed. The watershed begins high in the Green Mountains, flows to the west and joins the Hoosick River just across the New York border. Folded and faulted Cambrian and Ordovician age limestone and dolomites underlie most of the Central Valley (Kim, 2017). The Walloomsac River and its tributaries trend along faults that developed during Taconic and Acadian mountain building events that formed the Taconic Highlands and Green Mountains (Figure 3). The full extent to which the bedrock has been fractured by tectonic events and glacial unloading remains unknown.

Silty soils formed from glacial deposits cover most of the North Bennington area (Figure 4). The shape of the underlying bedrock surface and glacial deposits control the topography of the Valley (Stewart and MacLintock, 1969). Glacial silt, sand, and clay 10 to 20 feet thick mantles the bedrock throughout the area (DeSimone, D. J., 2017). Glacial till has variable water infiltration and permeability characteristics, whereas sandy and gravel deposits on the north side of the Wallomsac River have high water infiltration and permeability characteristics.

Two aquifers lie under North Bennington: 1) a shallow permeable sand and gravel aquifer about 30 to 100-feet thick located on top of bedrock, and 2) a fractured bedrock aquifer from 100 to 400 feet beneath the land surface (Jerris, R.M., and DeSimone, D.J., 1992). The vast majority of domestic water wells draw water from the fractured bedrock aquifer. The bedrock aquifer is replenished (recharged) from precipitation infiltrating the overlying soil and shallow aquifer, and exposed bedrock at the land surface.

Shallow groundwater flow is driven by changes in elevation of the zone of saturation, called the “water table”. Groundwater moves from high to low elevations, measured from the height of standing water (called “hydraulic head) in wells that intersect the water table. No water table map has been prepared for the North Bennington area. Bedrock groundwater flow is driven by changes in pressure within the fracture system – flow moves from areas of high pressure to areas of lower pressure. Kim and Dowey (2017) produced a map of static water levels (Figure 5) that can be used broadly to define bedrock groundwater flow horizontally. Static water levels in deep, open-holed bedrock wells reflect the *net effect* of water entering and leaving fractures penetrated by wells (Reilly and others, 1989). The broad trend of static groundwater elevations shows that bedrock groundwater moves east to west along the larger drainages of the Wallomsac River towards the Saint-Gobain Water Street plant and then past it.

Faulting and folding, and partial metamorphism (a geologic term for “pressure cooking”), of the rocks underlying North Bennington profoundly complicates the hydrogeologic system. Groundwater in rugged topographic settings such as North Bennington usually moves in “nested” flow systems, wherein shallow groundwater recharged on hills flows and discharges to immediately adjacent small streams and other surface water bodies. These small groundwater flow systems lie over deeper

intermediate scale, or regional scale, systems that can bypass the smallest streams to discharge at larger ones much further down the hydraulic gradient.

That groundwater flow systems are "nested" at different scales, with hilly regions having aquifers with low permeability, has been well known and documented by the hydrogeologic community for over 50 years (e.g. Freeze and Cherry, 1979; Winter and others, 1988; Siegel and others, 2015). Artesian wells in North Bennington, with water flowing naturally above the land surface, speak to where local fractures may intersect deep flow systems. But there is insufficient information on how groundwater moves vertically to determine to any detail how groundwater flow systems operate in North Bennington.

The fracture network in North Bennington does not connect sufficiently to mimic what is known as an "equivalent porous media" (e.g. Anderson and others, 2015). For example, a figure of well yield versus well depth (Jerris and DeSimone, 1992) (Figure 6), shows that wells can produce water from negligible amounts to tens of gallons per minute independent of depth. Well production is a function of local conditions depending on whether permeable surficial materials or sets of connected bedrock fractures intersect the well bore. Local clusters of fractures operate largely independent of the whole in many fractured rock settings (e.g. Berkowitz, 2002, and references therein). Some wells can be drilled hundreds of feet deep without sufficient yield of water, and others will yield tens of gallons per minute at 100-feet. Any evaluation of the hydrodynamics of groundwater flow in the North Bennington area, and of contaminant transport, must be analyzed in the context of this uncertainty.

## 2.3 Relationship between the PFOA Plume and Groundwater Setting.

The pattern of PFOA groundwater contamination identified by the VT-DEC is consistent with atmospheric deposition of PFOA contamination from air emissions from the Saint-Gobain plants. This pattern is uniquely different from other potential sources such as contamination entering the aquifer from subsurface or surface spills at Water Street or Northside Drive.

The PFOA groundwater plume from the Water Street plant extends in all directions, but farthest to the east. The plume crosses small watershed divides; this could not happen were contamination from surface or shallow spills. Moreover, if the contamination had resulted from surface discharge at the Water Street plant, the PFOA plume would have moved predominantly to the west in the direction of groundwater and surface water flow rather than dominantly to the east in the direction of winds. Existing PFOA contamination west of the Water Street plant now partly relates to subsurface westerly groundwater flow and from atmospheric deposition west of the plant. The most contaminated water near the Water Street plant likely will continue to move westward, to contaminate groundwater yet not affected by PFOA.

Some domestic water wells located within the groundwater plume have tested at non-detect or less than 20 ppt concentrations of PFOA. Groundwater in water wells in this area derive from multiple fractures, and from heterogeneous sandy deposits which can change their yield of water to well bores seasonally and with pumping. Some fractures and other heterogeneities may have water more laden with PFOA than others. Because of this natural variability of the aquifer systems, multiple sampling events at individual wells have shown a two-fold and more variability in PFOA concentrations (Presentation of Dr. Timothy Shroeder, April 27, 2017, https://vimeo.com/215660364, starting at 49 minutes). Therefore, within the broad

plume area, wells measuring PFOA less than 20ppt may well have greater PFOA contamination at some later time.

In conclusion, the zone of PFOA contamination designated by the State of Vermont reasonably represents the area where groundwater has been contaminated with PFOA by the operations of the former Saint Gobain facilities on Water Street and Northside Drive. Water wells located within the groundwater plume where PFOA was measured below 20 ppt may have much greater concentrations when tested in the future. Areas within the groundwater plume that were not tested because of the absence of domestic water wells are likely contaminated with PFOA, as well.

## 3.0 Air Modeling of PFOA Dispersion

It is well known that wind transports any contaminants released by “smoke” stacks from power plants, incinerators, and other industrial facilities, and such contamination is deposited on the land surface in the downwind directions. The PFOA groundwater contamination plume in North Bennington in this case mimics the atmospheric distribution of PFOA from the Saint-Gobain plants. This distribution is typical of contamination produced from other contaminant point sources to the atmosphere. For example, Fioletev and others (2011, 2017, in review) document the shapes of broad sulfur dioxide plumes from coal-fired power plants in Midwestern United States. It now is common knowledge that such emissions in the past led to widespread acidification of both surface and groundwater, extending from the northeastern United States to northern Minnesota (https://en.wikipedia.org/wiki/Acid_rain). Shin and others (2012; 2011) well documented the same for atmospheric deposition for PFOA.

PFOA deposition modeling by Gary Yoder (TRM, 2017) shows a plume of deposition consistent with these kinds of point source atmospheric emissions. Hydrogeologists rely on such models to determine atmospheric sources of contamination, and patterns of contamination. In the case of North Bennington, the pattern and distribution of PFOA-contaminated groundwater agrees, not only with the results of the Yoder AERMOD model, but also with the AERMOD models prepared by Barr (2017) and the VT-DEC (2017).

In summary, Yoder’s air modeling efforts demonstrate that PFOA from Saint-Gobain dispersed and contaminated soils throughout the North Bennington area, which, in turn, contaminated groundwater.

## 4.0 The Bennington Landfill and PFOA Contamination

The former Bennington Landfill operated from 1969 – 1987, during which time it received municipal, commercial and industrial waste from the greater Bennington area. As part of landfill regulatory closure, site characterization identified arsenic, barium, manganese, volatile organic compounds (VOCs) and polychlorinated biphenyls (PCBs) in groundwater samples, and the landfill entered into the USEPA Superfund program in March of 1989 as Site No. VTD981064223.

Because of topographic high areas located west of the landfill, the Bennington Landfill is located in a separate watershed from PFOA contaminated domestic wells located to the southwest of the landfill (TRC Companies, 1997; McLaren/Hart, 1997; 1999). Differences in water levels in monitoring wells, in both the bedrock and the shallow sand and gravel aquifer under the landfill, confirm that both surface water and groundwater beneath and around the landfill flow to the east and southeast, not to the west or southwest. Moreover, except to the northwest, partly dry and low permeability glacial till, glaciolacustrine sediments, and saprolite (Dames and Moore, 1998) "perch" the shallow water table in the shallow sand and gravel aquifer under the landfill, and confine and isolate it from the underlying bedrock.

In 1999, the USEPA determined that the landfill closure remedy was complete and, because of the foregoing hydraulic features, both shallow and bedrock groundwater posed no risk for off-site contamination (USEPA, 2017).

PFOA was later detected in the landfill's shallow aquifer monitoring wells B-8-1 (18 ug/L); B-15 (36 ug/L); B-1-1 (21 ug/L); B-1-2 (140 ug/L) and B-7-1 (51 ug/L). These PFOA concentrations are similar to those observed in domestic water wells both upgradient and downgradient of the landfill (Figure 6), consistent with

concentrations derived from the same atmospheric source. The PFOA concentration in well B-7-1, about 100-feet west of a former liquids disposal pit identified as a source of contamination (McLaren/Hart 1999), had the lowest PFOA measurement of any of the landfill monitoring wells. Were groundwater moving from the pit location to the west, this monitoring well would have tested far higher for PFOA. As elsewhere in the zone of contamination, PFOA in monitoring wells close to the landfill likely derives from atmospheric deposition from Saint-Gobain.

The Bennington Landfill is not a plausible source of PFOA contamination of the domestic water wells located near it. Rather, atmospheric deposition of PFOA by Saint-Gobain is the source of PFOA now contaminating domestic water wells, including those on the eastern end of the zone of contamination nearest the landfill.

## 5.0 Other Potential Sources of PFOA in North Bennington Groundwater

No evidence of other plausible sources of PFOA has been presented by Saint-Gobain that would account for the patterns and the concentrations of PFOA in groundwater throughout the zone of PFOA contamination in the North Bennington area. Barr (2017) suggested, without evidence, that local industries may have used PFOA, and deposited industrial waste laden with PFOA into the Bennington Landfill. However, the only evidence we have seen of PFOA disposal in the landfill is disposal of “Teflon sludge” and waste dispersions by the Chemfab/Saint-Gobain plant. Barr has also suggested that sludge from the Bennington Wastewater Treatment Plant could be a source for PFOA contamination. However, there is as yet no evidence for widespread disposal of such sludge. In any event, even if such sludge disposal occurred, Saint-Gobain is the only industry known to have discharged wastewater likely to contain PFOA to the wastewater treatment plant.

PFOA identified in monitoring wells around the landfill are consistent with the range of concentrations for other PFOA contaminated water wells in this area of the valley. If the landfill were a source of PFOA to groundwater, there would be a distinctive pattern of water wells with higher concentrations of PFOA closer to the landfill. Such a pattern does not exist.

In conclusion, I find no other credible, potential sources that would account for the patterns and concentrations of PFOA throughout the zone of contamination in the North Bennington area, but for Saint-Gobain.

## 6.0 Persistence of PFOA in Groundwater

### 6.1 Transport Processes

PFOA is a chemical that persists in the environment. The large chemical energy between fluorine atoms and the carbon core of PFOA makes the chemical almost impossible to degrade or break down naturally (e.g. Prevedouros and others, 2006; Cheng and others, 2008). Therefore, PFOA moves ("advects") with the water within which it is dissolved. Rain containing PFOA falling on soils funnels the PFOA containing water into preferential soil flow paths to the water table below (e.g. Nimmo, 2012; McDonnell and others, 2007). In the way, some PFOA weakly sticks ("sorbs") onto natural organic matter in the soil. The sorption capacity of PFOA is far less than pesticides and many other organic contaminants, which means PFOA travels quickly to the water table.

PFOA will "sorb" to soils with sufficient organic concentrations. The upper 2-feet of soil near the Saint-Gobain Water Street plant contains an average of 2-percent organic material, which sorbed PFOA that was deposited from the atmosphere. C.T. Male (2017) sampled the upper 2-feet of soil and defined a PFOA soil plume trending west to east away from the Saint-Gobain plant (Figure 7), consistent with what would be expected from PFOA stack release at the Saint-Gobain Water Street plant. But soils in the North Bennington area are thicker than two feet thick (VGS, 2010), and Male (2017) did not determine concentrations of PFOA in soils deeper than 2-feet. So an un-sampled pool of PFOA sorbing to soil may still remain above the water table. For example, Weber and others (2017) found PFOA tens of feet deep in a similar sandy hydrogeological environment.

6.2 Heuristic Modeling of PFOA Transport.

Hydrogeologists commonly use mathematical models, or mathematical conceptualizations, to characterize and forecast fate and transport of water and contamination in the subsurface.

Instead of using a complex mathematical model for PFOA transport through soils at North Bennington, for which we have minimal local data of all kinds to constrain, I used a scientifically accepted one-dimensional steady state screening approach (Rao and others, 1985, cited e.g. by Alley, 1993; Bevin and Germain, 2013); to estimate how long it would take PFOA deposited on the land surface to reach the water table. The National Academy of Science (NAS, 1984) highlighted this model as a suitable screening tool to characterize the movement of pesticides and other contaminants through soil given the uncertainty of how contaminants move through the unsaturated zone.

The approach I used (Rao and others, 1985) incorporates many of the same parameters applied to complex deterministic models for organic contamination (e.g. sorption, degradation, material properties and organic content of soils), but weights and averages them through unsaturated soils, rather than partitioning soils into horizons for which little direct information is known.

I modeled PFOA transport for the area of the most contaminated zone east of the Water Street plant, underlain by fractured bedrock, where measured PFOA concentrations range from 1,000 to 4,000 ppt. I assumed the water table was about 35-feet deep, in the absence of direct information, and arrived at maximum travel time of PFOA to the underlying water table of about 10 years. Barr (2017) also determined, by using a more complicated model for PFOA transport through soils, that PFOA would reach the water table everywhere it deposited on the landscape.

This timing is most sensitive to values assumed for the parameters governing sorption (“sticking”) of PFOA to organic matter, and the assumed depth of the water table. If the water table is closer to the land surface, contamination will reach the water table faster.

I used the chemical factor governing how much PFOA sorbs to the soils (the distribution coefficient, Kd) from a study published by Milinovic and others, (2015) which determined Kd directly in experiments on silty loam soil, very similar to soil found in North Bennington. As previously discussed, PFOA does not sorb much to soils and moves essentially “conservatively” in water.

My estimation using the Rao and others approach leads to the conclusion that the PFOA transported atmospherically to the land surface in North Bennington would have reached the water table long before it was measured in 2017, and most likely within 10 years after initially being deposited on the landscape except where the water table is more than 35 feet deep. There, PFOA deposited would have taken longer to arrive to the water table and it also will take longer to flush out after.

## 6.3 Concentrations of PFOA in Groundwater Compared to Modeled Deposition.

After I calculated the approximate time required for PFOA to reach the water table, about 6 years in this example, I used solutions for the differential equations governing mixing of waters (Boyce and DiPrima, 1973, cited in Harte, 1988) to determine if the range of deposition rates estimated by Yoder (2017) would be sufficient to explain the PFOA concentrations observed in 2016.

For mixing of PFOA laden recharge with aquifer water for 24 years:

$Mass_{PFOA}$ (t) = ($Mass_{PFOA}$-initial)/(Vol. rech /Vol-gw) +( $Mass_{PFOA}$-initial)/(Vol. Rech )x $e^{-(Vol\ Rech./Vol\text{-}gw)x\ t)}$

Where:

Mass of PFOA in the aquifer at a given time prior to dilution with clean water

“t” the time for PFOA reached the water table until dilution began, 24 years.

Vol-gw is the volume of water in the aquifer

Vol-rech is the volume of either contaminated recharge per year

For mixing of clean water with contaminated aquifer water after dilution began:

$Mass_{PFOA}$ (t) = ($Mass_{PFOA}$-gw x $e^{-(Vol\ Rech./Vol\text{-}gw)x\ t)}$

Where:

$Mass_{PFOA}$-gw is the mass of PFOA in the aquifer immediately prior to dilution

The Water Street plant closed near the end of 2001, but it would have taken another 6 years for clean water to displace the PFOA-laden water in the soil zone before clean recharge could reach the aquifer again in this example scenario.
I assumed the fractured rock aquifer was 300 feet thick (91.4 meters) and that it had a porosity of 0.03, three percent to calculate the volume of water in a column of the aquifer with an area of one meter square.

Using this simple model, and applying deposition of 3 mg/M2/yr derived from Yoder (2017) maps of deposition at different rates, I arrive at a concentration of about 1,000 ng/L in groundwater due east of the Water Street plant in 2016, consistent with observed range of 1,000 to 2,500 ng/l in groundwater. Although I ran the model initially for emission rates of 1,000 and 10,000 pounds per year, I found that the emission rate for this amount in groundwater would be 1,000 pounds of PFOA/year agrees with what was observed in aquifer water. If the aquifer were thinner, there would be less water in it and concentrations would be higher. If thicker, concentrations would be lower. If the porosity were twice as high as what I assumed

(3%), the concentration would be halved. If porosity were larger concentrations would be less. If more PFOA were delivered to the land surface, the concentrations would be higher.

But fundamentally, the predicted results were very similar to those observed, and changing parameters within plausible amounts would arrive to the same conclusion. My calculations agree with the prior conclusion based on atmospheric air modeling by Yoder (2017) -- Saint-Gobain's air emissions on the order of 1,000 pounds/year or more constituted the source of PFOA in North Bennington groundwater. The response of PFOA in groundwater to the atmospheric deposition elsewhere in the contaminated zone is the same. I ran the model for an area around the Bennington Landfill and found that being farther away from the Saint-Gobain plant, PFOA deposition rates were less, but aquifer PFOA depletion rates were similar. My calculations predicted groundwater concentrations of about 24 ng/L if 1,000 pounds of PFOA were released by Saint-Gobain on an annual basis. The average concentration of PFOA in domestic water wells on the roads that surround Bennington Landfill (Houghton Lane, Squaw Hill Road, Rock Lane, and Autumn Acres Road) is 36.39 ng/L.

6.4 Future Natural Attenuation of PFOA in Groundwater by Dilution and Flushing.

PFOA persists in the environment and groundwater essentially forever. Because of the length of time this will likely take, PFOA contamination of groundwater by Saint-Gobain has for all practical purposes removed groundwater as a drinking water source where impacted except for at the very margins of the affected area. It will take up to a century before all of the aquifer has concentrations of PFOA less than 20 ppt. However, because no additional PFOA is being added to the soils by air deposition from the Saint-Gobain facility, dilution through groundwater recharge

and groundwater flow will eventually reduce the concentrations of PFOA in the groundwater in North Bennington.

Simple dilution of groundwater after the plant closed follows an exponential function, and based on this approach, it would take decades up to a century for groundwater with over 1,000 ng/L to dilute to below 20 ng/L, and decades for sufficient dilution to occur near the periphery of the contaminated zone.

However, not all dilution of the aquifer comes from recharge above. Cleaner groundwater moves towards the Walloomsac River from the periphery of the contaminated zone *towards* the source of PFOA on Water Street. Ultimately, the aquifer will flush itself of PFOA since PFOA behaves non-reactively and travels with the ground water.

There literally are no data on how fast groundwater moves in North Bennington, since suitable engineering tests (e.g. pumping tests) to determine the appropriate properties of the aquifer from which groundwater velocities in fractured rocks can be estimated have not been done (e.g. Novakowski and others, 2009).

However, at the watershed scale, we can use a broad mass balance approach to address both horizontal displacement of the plume as well as dilution from above. The concept is simple, and yet powerful as a tool to determine how long it would take the entire contaminated aquifer to be naturally cleaned up.

Hydrologists use a term called base flow to explain the release of groundwater to surface water bodies, such as streams and rivers. Base flow reflects groundwater discharging to the Walloomsac River. Base flow is equal to the amount of recharge infiltrating into the aquifer every year, which in this case is about 160 ft3/s. The area of the contaminated plume (about 11.8 square miles) is about 10% of the watershed

of the river upstream of the USGS gage due west of the Water Street plant. Most of the water entering the river does not pass through and cannot dilute the contaminated zone.

A PFOA concentration of 9 ng/L was measured in the river near the USGS gage on March 10, 2016 when the river flowed at about 430 ft3/s, diluting base flow by about 2 and a half times. Taking this dilution into account, the concentration of PFOA in base flow being delivered to the river at the USGS gage would be about 27 ng/L. Multiplying this amount by annual base flow discharge arrives to annual loss of about 3,500 grams of PFOA by groundwater discharge per year.

I then estimated the total mass of PFOA in groundwater by multiplying the areas of contamination defined by concentration ranges shown on the VT-DEC Area of Interest map by an assumed aquifer thickness of 300 feet and an active porosity of 0.05 percent, between that of fine sand and fractured rock. The total mass of PFOA in the groundwater would be about 500,000 grams.

Dividing this total amount in the aquifer by the annual loss of 3,500 grams arrives to about 140 years for all the PFOA to be removed from the groundwater, neglecting desorption of any remaining in the soils at a later time which would continue to bleed out some PFOA into the groundwater.

Of course, over time as more PFOA from the “heart” of the plume is lost, base flow concentrations will become lower as PFOA mass from the aquifer naturally is removed. So, the time until less than 20 ng/L is achieved in groundwater everywhere in the aquifer groundwater will be shorter.

But, my calculation generally agrees within an order of magnitude with what I calculated from a simple vertical dilution and both serve the purpose of

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understanding whether PFOA will naturally be removed in a generation or more. It won't.

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Figures

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[redacted]


Location of North Bennington Located in Walloomsac River drainage between the Green Mountains and Taconic Mountain.

[redacted]

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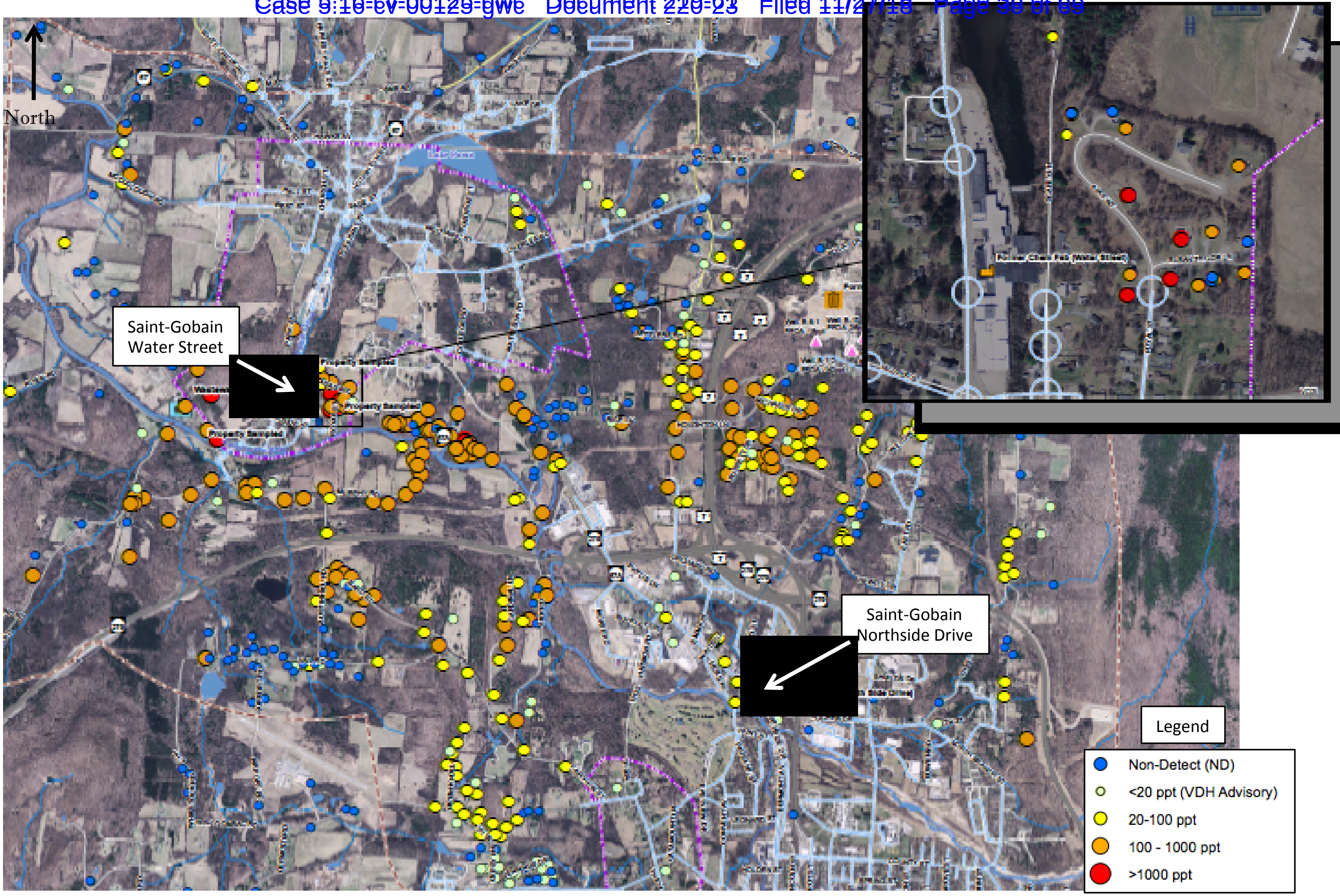
| Site Location Map | | 1 |
|---|---|---|
| Prepared for: Langrock, Sperry & Wool LLP | | |
| Date: 29 August 2017 | Scale: as shown | |




Adapted from VT-DEC Sample Report Dated 27 April 2017

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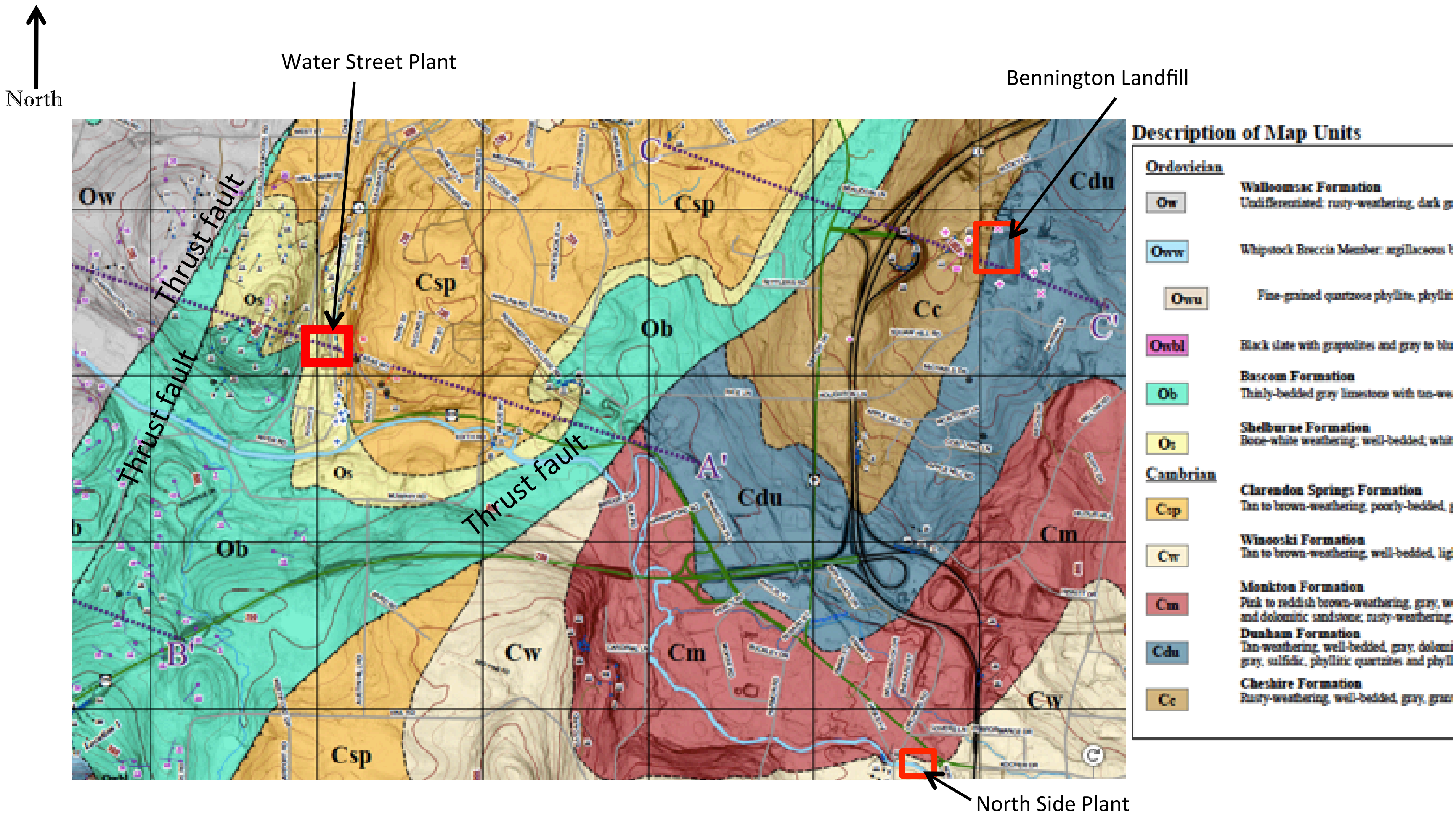
PFOA Plume in North Bennington

Prepared for: Langrock, Sperry & Wool, LLP

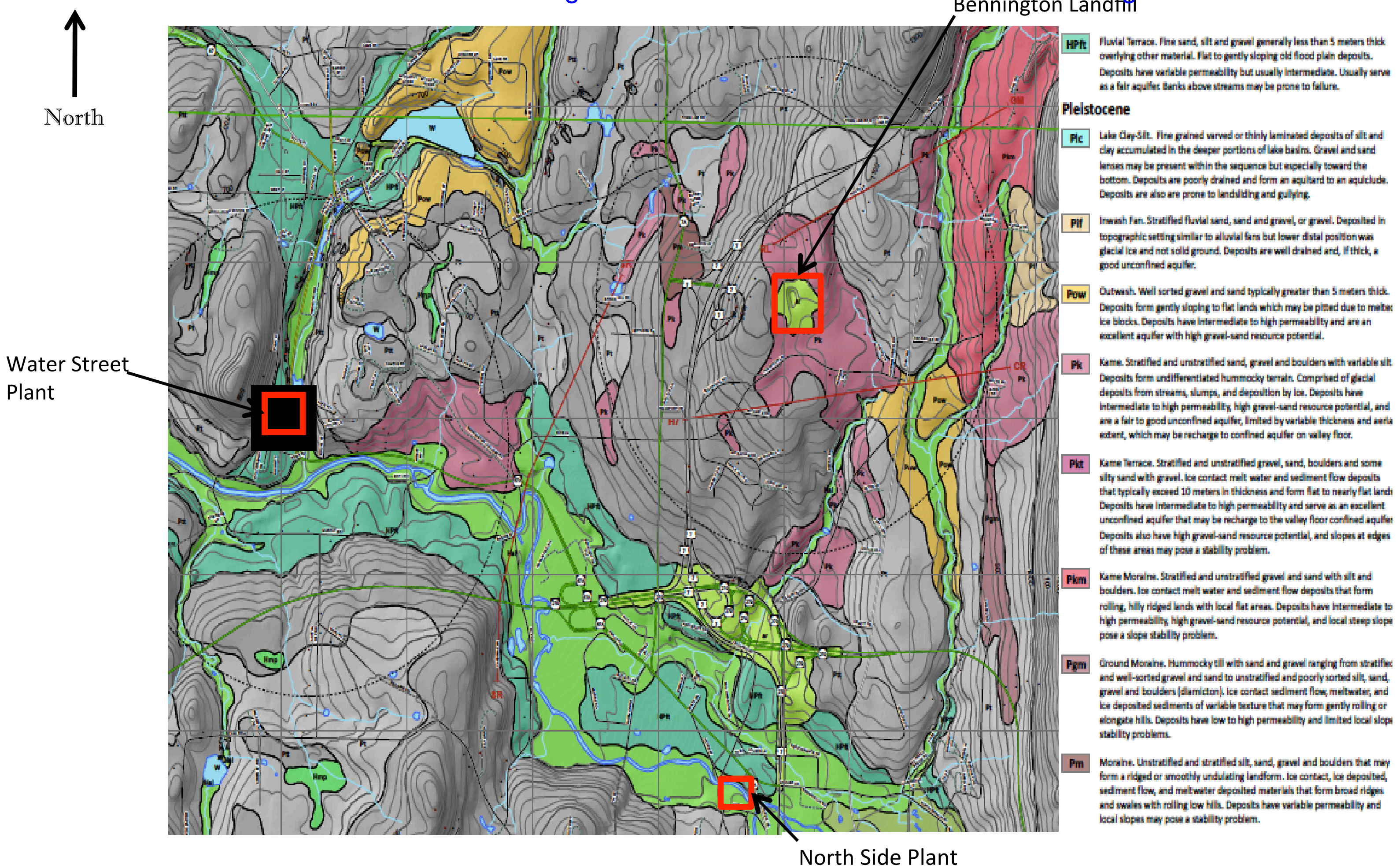
Date: 28 August 2017

Scale: *as shown*

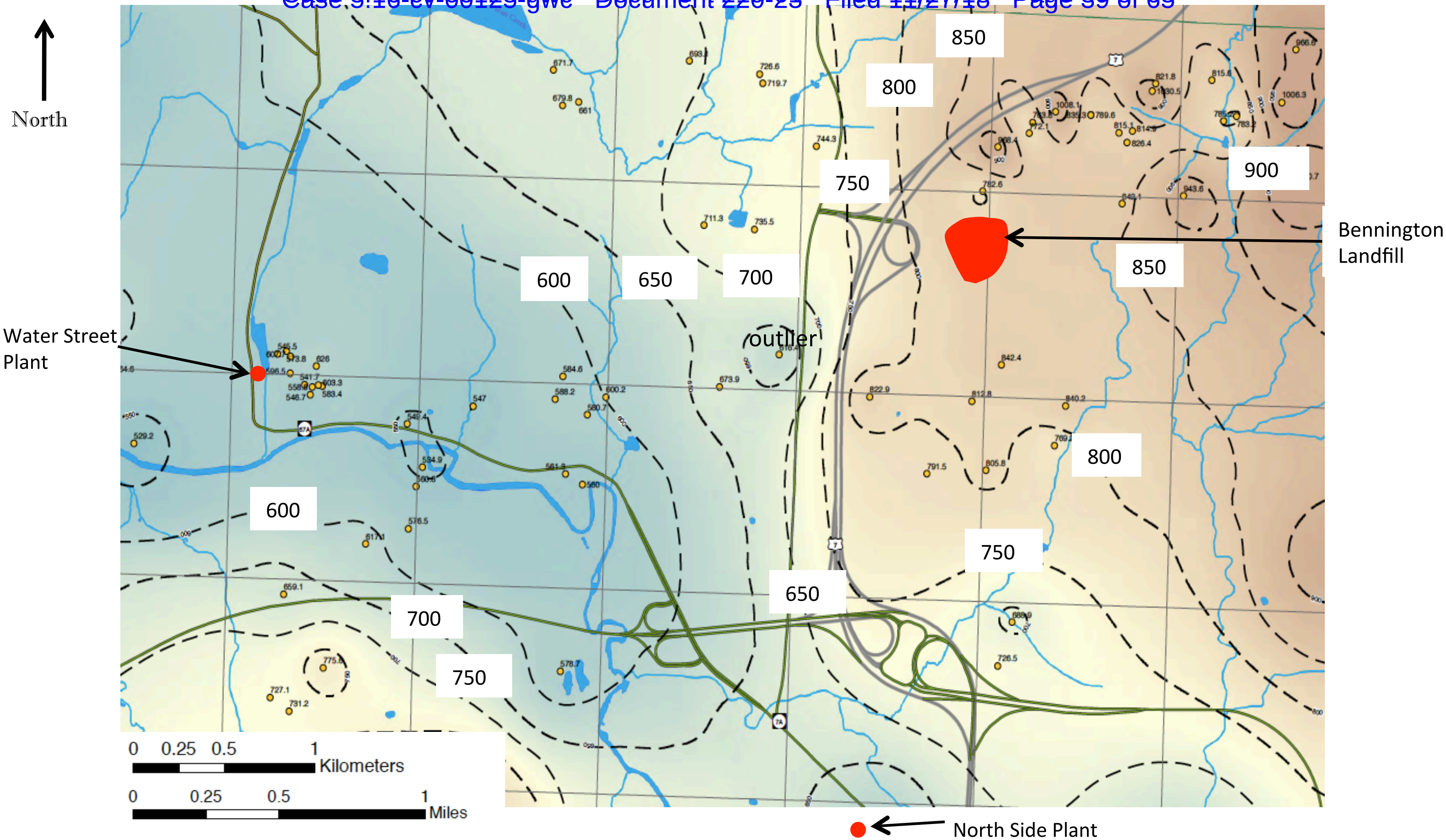
2




Geologic map of the North Bennington area. Saint-Gobain plants and Bennington Landfill shown as red rectangles (Modified from Kim, 2017).




Surficial geologic map of the North Bennington area. Saint-Gobain Plants and Bennington Landfill shown as red rectangles (Modified from DeSimone, 2017).




Static water level (in feet above sea level) for North Bennington Area. Saint-Gobain Plants and Bennington Landfill shown as red dots. In bedrock, ground water moves perpendicular to the lines of equal water levels given as dashed black lines, generally to the east towards the major river valley. However, shallow ground water will move towards local drainages as shown by the watershed within which the Bennington Landfill is located (Modified from Kim and Downey, 2017).

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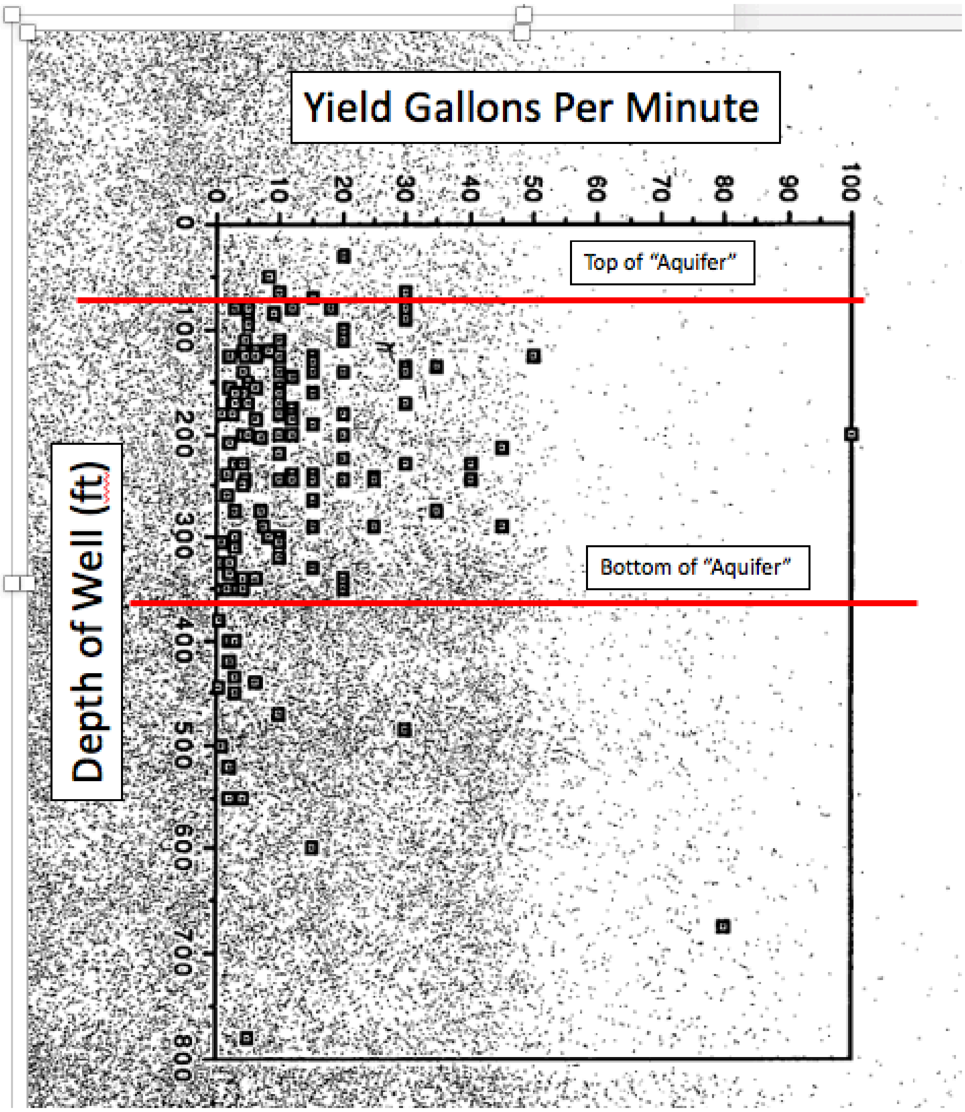
North Bennington Static Water Level

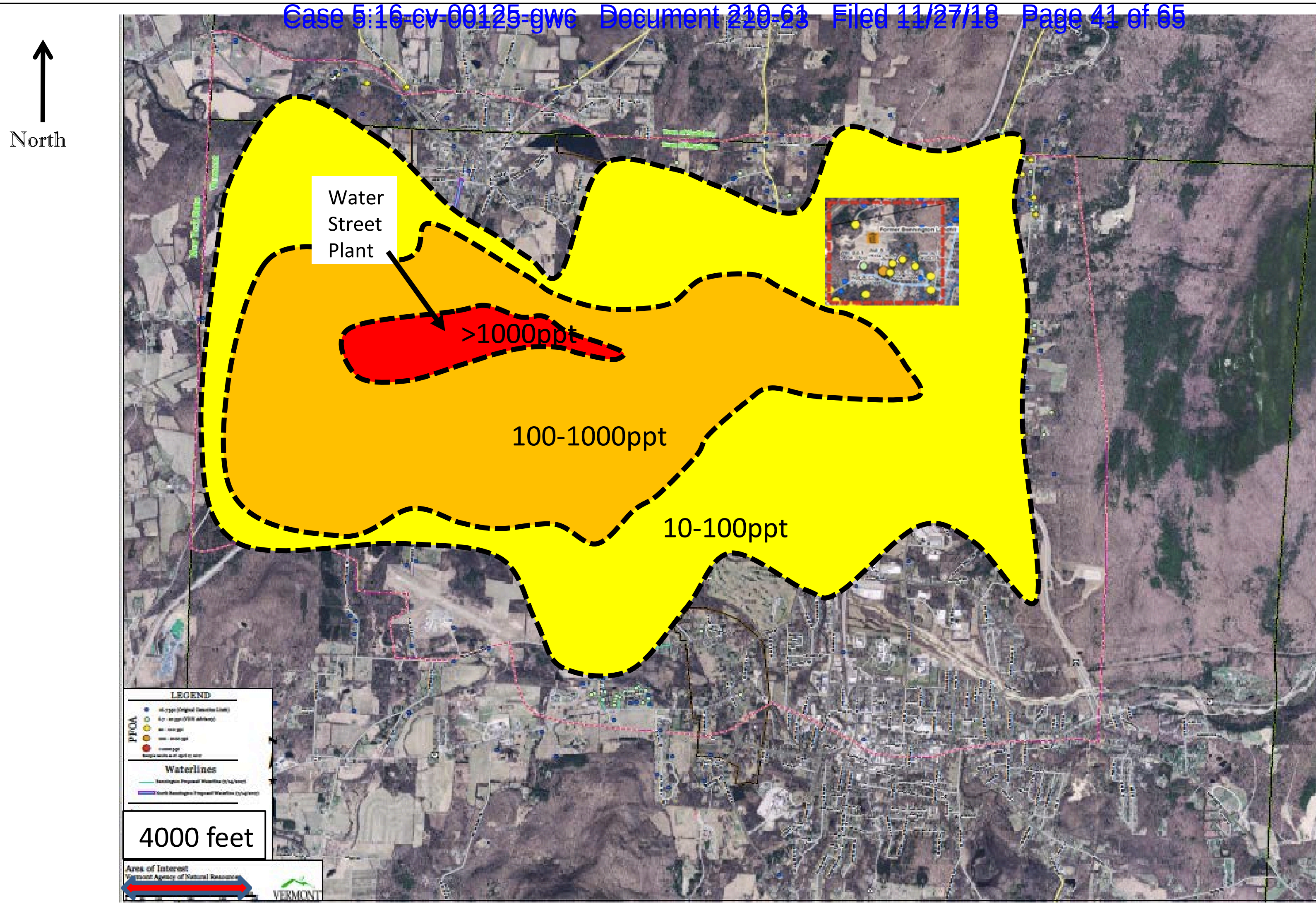
Prepared for: Langrock, Sperry & Wool, LLP

Date: 28 August 2017

Scale: *as shown*

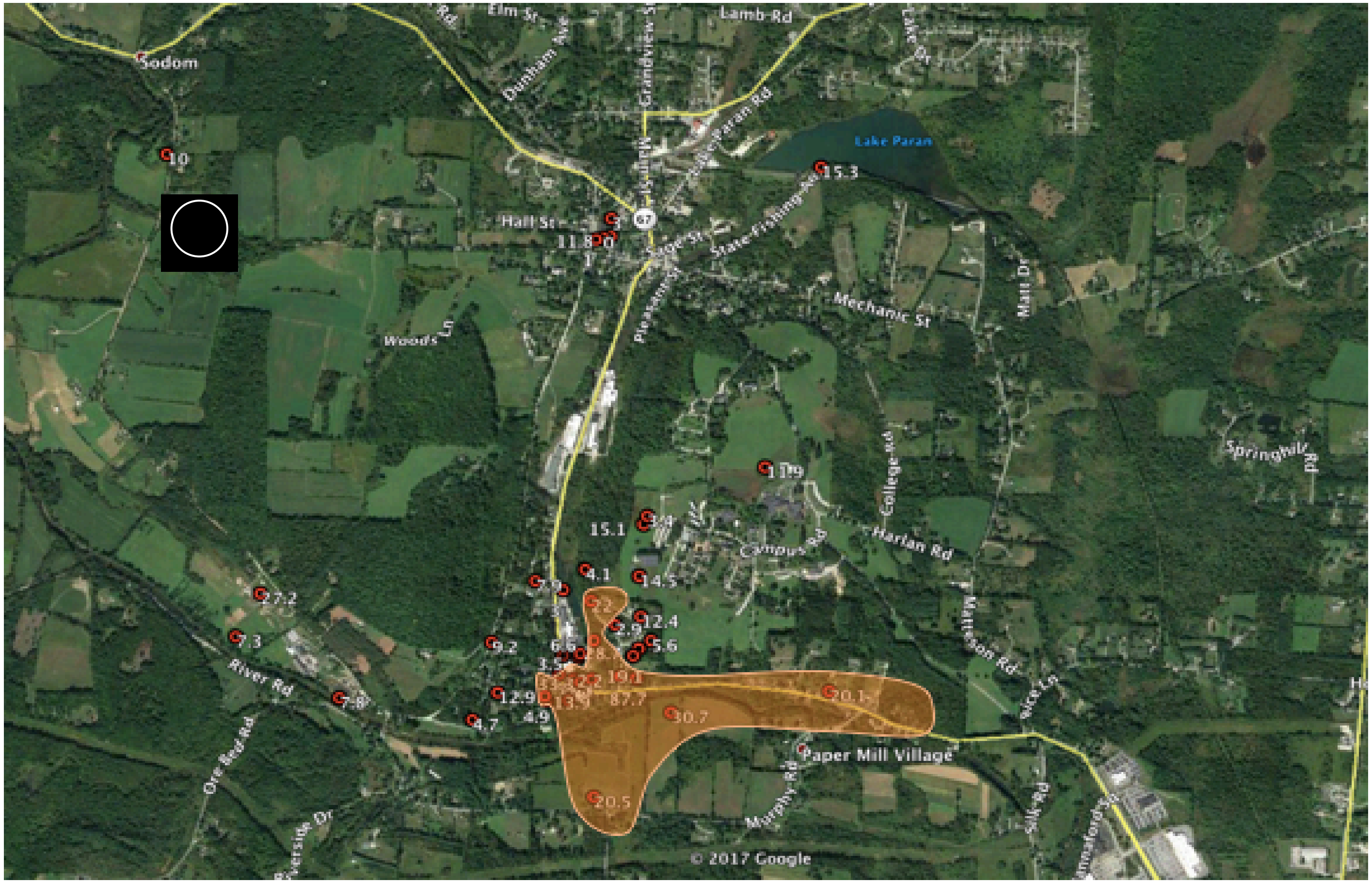



Graph showing yields to domestic water wells as a function of their depth. There is no clear relationship other than below 300 feet, fractures providing water appear to pinch out. If fractures were well connected, the yields with depth would increase as greater thicknesses of aquifer are penetrated that can produce water (from Jerris and Simone, 1992).




Plume of PFOA in ground water in the North Bennington Area. Concentration ranges in ppt (Modified from VT-DEC, April, 2017). Bennington Landfill in upper right hand occurs within the PFOA plume. Uncertainty remains on how far the plume extents laterally.

North




Plume of total PFOA in the upper 2 feet of soils trending east of the Saint-Gobain Water Street Plant. Plume defined by >20 ppb PFOA. Note the sparse soil sampling and how variable the concentrations of PFOA are in the upper two feet of soil. Almost 20 ppb occur in a sample in the far NW. The variability relates to the degree to which organic matter locally occurs i n the soils, preferential flow paths moving water downward, and deposition rates.

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| | |
|---|---|
| PFOA in Upper 2-Feet of Soils East of Plant | 8 |
| Prepared for: Langrock, Sperry & Wool, LLP | |
| Date: 28 August 2017 | Scale: *no scale* |

Appendix A

**DONALD I. SIEGEL**

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## EDUCATION

| | | | |
|---|---|---|---|
| University of Minnesota | Hydrogeology | 1974-1981 | Ph.D. |
| Penn State University | Geology | 1969-1971 | M.S. |
| University of Rhode Island | Geology | 1965-1969 | B.S. |

## EMPLOYMENT

| | | |
|---|---|---|
| Chair, Dept Earth Sciences | Syracuse University | 2012-2017 |
| Full Professor | Syracuse University | 1993-present |
| Senior Hydrogeologist | Stearns & Wheler Engineers and Scientists | 1985-1997 |
| Hydrologist/Geochemist | U.S.Geological Survey | 1976-1982 |
| Geologist | Amerada Hess Corp. | 1971-1973 |

## PROFESSIONAL RECOGNITION

**Fellow American Gephysical Union,** 2013

**Fellow American Association Advancement of Science,** 2012

**Laura J. and L. Douglas Meredith Teaching Professor,** Syracuse University, 2009

**Lifetime National Associate Member,** The National Reseach Council (National Academy of Sciences), 2008

**The O.E. Meinzer Award In Hydrogeology,** Hydrogeology Division, Geological Society of America, 2005

**Councilor of the Geological Society of America,** 2002-2005

**Distinguished Service Award,** Hydrogeologic Division**,** Geologic Society of America, 2001

**Expert Witness to the United States Senate,** Subcommittee on Environment and Public Affairs, Wetland Characterization**,**June 26, 1997

**Expert Witness to the United States House of Representatives Committee on Science, Space and Technology**, Hydraulic Fracturing. April 23, 2015.

**Fellow,** Geological Society of America, elected 1995

**Birdsall Distinguished Lectureship in Hydrogeology** , Geological Society America, 1992-1993

**Chairman, National Water Science and Technology Board**, June 2010-2013.

Member National Water Science and Technology Board, **National Research Council**, 2008-2013

Committee on Techniques for Assessing Ground Water Contamination, **National Research Council, National Academy of Science**, 1991-1993.

Committee on Techniques for Wetland Delineation, **National Research Council, National Academy of Science**, 1993-1994.

Committee on U.S. Geological Survey Hydrologic Research: Regional Aquifer System Analysis, **National Research Council, National Academy of Science**, 1998-2000

Committee on U.S. Geological Survey Hydrologic Research: Water Use, **National Research Council, National Academy of Science**, 2000-2001

Committee on U.S. Geological Survey Hydrologic Research: Stream Information Program, **National Research Council, National Academy of Science**, 2001-2004

Chair, Committee on U.S. Geological Survey Hydrologic Research: River Science, **National Research Council, National Academy of Science**, 2002-2005

Committee on Groundwater Fluxes, **National Research Council, National Academy of Science**, 2002-2003.

Committee on River Science (Chair), **National Research Council, National Academy of Sciences**, 2003-2006.

Committee on the Future of USGS WRD, **National Research Council, National Academy of Sciences**, 2005-2008.

Committee on Environmental Impact of Coal-Gas Methane Production, **National Research Council, National Academy of Science** 2008-2010

Chair, Committee on 3rd Phase National Water Quality Assessment, USGS, **National Research Council, National Academy of Science** 2010-2012

**Book Editor, Geological Society of America,** 2007-2010

**Associate Editor,** Hydrologic Processes, 2006-2008

**Associate Editor,** Geosphere, 2005-2007

**Associate Editor,** Geology, 2005-2007.

**Associate Editor,** Hydrogeology Journal, 2005-present.

**Associate Editor**, Water Resources Research, 1993-1996; 2010-present

**Associate Editor**, Wetlands. 1995-1998

**Associate Editor**, Ground Water, 1997-2005.

## TEACHING EXPERIENCE

### Syracuse University

Hydrogeology (advanced undergraduate/graduate)
Contaminant Hydrogeology and Geochemistry (graduate)
Groundwater and Solute Transport Modeling (graduate)
Hydrogeochemistry (graduate)
Aqueous Geochemistry (graduate)
Wetland Hydrology and Geochemistry (Graduate)
Case Studies in Hydrogeology (graduate)
The Science of Water (undergraduate(
World Water (undergraduate)

### Short Courses

Wetland Hydrogeology and Geochemistry, 1995, Geol. Society of America
Applied Groundwater Geochemistry, Geol. Society of America, National Meeting 2000, 2002; MA and NY Dept. Natural Resources and Environmental Conservation, 1990-1994; Licensed Site Professionals Association of Mass (1999); Environmental Professionals of Connecticut, 2001; Central New York Association of Professional Geologists (1997). Geological Society of America National Meeting, 2002.
Tracer Methods in Hyrology, Licensed Site Professionals Association of Mass (1999);
Environmental Professionals of Connecticut, 2007; Central New York Association of Professional Geologists (2005).
Visual Modflow Groundwater Modeling for Managers, City of New York Dept. Environmental Protection, 1999

Pesticide Transport and Fate, Montana Department Environmental Quality, 2000
Co -Chair, Teaching Hydrogeology in the 21st Century, NSF Workshop, Lincoln, Neb., spring 2006

**PROFESSIONAL SOCIETY MEMBERSHIP**

Geological Society of America (1980's to present)

American Geophysical Union (1980's to present)

Association of Wetland Scientists (1990-1997)

National Groundwater Association (1980's to present)

**REFEREED PUBLICATIONS IN PAST 10 YEARS**

**Articles (By Year)**

1. Azzolina,N.A., **Siegel, D.I**. **,**Brower, J.C., Samson, S.D., Otz, M.H. and Otz. I., 2007, Can the HGM Classification of Small Non-Peat Forming Wetlands Distinguish Wetlands From Surface Water Geochemistry, Wetlands, vol. 27, p. 884-893.

2. Frey, K.E., **Siegel, D.I.** & Smith, L.C. 2007, Geochemistry of West Siberian streams and their potential response to permafrost degradation. Water Resources Research 43, W03406, doi: 1029/2006WR0049022006

3. Lautz, LK, **Siegel, D.I.,** Bauer, R.K.. 2007. Dye tracing through Sinks Canyon: incorporating advanced hydrogeology into the University of Missouri's geology field camp. Journal of Geoscience Education, 55(3): 197-202

4. Lautz, LK, **Siegel, D.I**., 2007. The effect of transient storage on nitrate uptake lengths in streams: an inter-site comparison. Hydrological Processes, 21(26):3533-3548

5. McKenzie, J., Voss, C., **Siegel, D.I.**, Provost, A., and Glaser, P. H., SUTRA-ICE; 2007, A 3-D Groundwater Heat-Transport Model with Ice Freeze and Thaw, *Advances in Hydrologic Sciences, in press.*

6. Bickford M.E.,**Siegel , D.I.,** Michael J. Mottl , Barbara M. Hill , Jennifer Shosa ,2008, Strontium isotopic relations among pore fluids, serpentine matrix, and harzburgite clasts, South Chamorro Seamount, Mariana forearc, Chemical Geology, Vol. 256, 24–32.

7. **Siegel, D.I.,** 2008, Reductionist Hydrogeology: The Ten Fundamental Principles, Hydrologic Processes, Hydrol. Process. 22, 4967–4970 (2008).

8. Chanton, J. P., P. H. Glaser, L. S. Chasar, D. J. Burdige, M. E. Hines, **D. I. Siegel**, L. B. Tremblay, and W. T. Cooper (2008), Radiocarbon evidence for the importance of surface vegetation on fermentation and methanogenesis in contrasting types of boreal peatlands, Global Biogeochem. Cycles, 22, GB4022, doi:10.1029/2008GB003274.

9. Endreny, A. and **Siegel, D.I.,** 2009, Investigating Earth Science in Urban Schoolyards, Journal Geological Education, vol. 58, 191-195.

10. Jin, L, **DI Siegel**, LK Lautz and MH Otz. 2009. Transient storage and the scaling of solute transport in a second order mountain stream. Hydrological Processes, 23(17):2438-2449, DOI: 10.1002/hyp.7359.

11. Jin, L. **Siegel, D.I.,** Lautz, L.K., Mitchell, M.J., Dahm, D.E. and Mayer, B. ,2009, Calcite precipitation driven by the common ion effect during groundwater-surface water mixing: a potentially common process in streams with geologic settings containing gypsum. The Geologic Society of America Bulletin. v. 122; no. 7-8; p. 1027-1038; DOI: 10.1130/B30011.

12. McKenzie, J.M. , **D.I. Siegel**, D.O. Rosenberry (USGS). 2009. Improving conceptual models of water and carbon transfer through peat in AGU Monograph: Northern Peatlands and Carbon Cycling, eds. Baird, Belyea, Comas, Reeve, and Slater, Geophysical Monograph Series, Volume 184, 299 pp. ISBN 978-0-87590-449-8

13. **Siegel, D.I**. ,2009, Reply to comment by Shlomo Neuman on 'Siegel D. 2008. Reductionist hydrogeology: ten fundamental principles. Hydrological Processes 22: 4967–4970'; Hydrol. Process..vol. 23, p. 1678.

14. Ying, X.Y., Li, Y.C.B., and **Siegel, D.I**., 2009,Source of sediments and metal fractionation n two Chinese estuarine marshes, Environ Earth Sci., p.1866-6280, DOI10.1007/s12665-009-0288-x

15. Bauer, RL, **DI Siegel**, EA Sandvol, LK Lautz, 2010, Integrating hydrology and geophysics into a traditional geology field course: The use of advanced project options. GSA Special Paper on Field Geology Education: Historical Perspectives and Modern Approaches

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18. **Siegel D.I.** and Baveye, P., 2010, Battling the Paper Glut, Science, vol. 329. p. 1466.

19. Trimble, S.W., McKelvey, B., Grody, W.W., Gad-el-Hak, M., **Siegel, D.I.,** Baveye, P.C., and Bauerlein, M. ,2010, Correspondence: Reward Quality Not Quantity," Nature 467, no. 7317, 14 October 2010

20. Endreny, TE, LK Lautz, and **D.I. Siegel**. 2011. Hyporheic flow path response to hydraulic jumps at river steps: flume and hydrodynamic models, Water Resources Research, 47. W02517, doi:10.1029/2009WR008631.

21. Endreny, TE, LK Lautz, and **D.I. Siegel**. 2011. Hyporheic flow path response to hydraulic jumps at river steps: hydrostatic model simulations, Water Resources Research, 47, W02518, doi:10.1029/2010WR010014.

22. Jin, L. Whitehead, P., **Siegel, D.I.** and St. Findlay, 2011, Salting our Landscape: An Integrated Catchement Model Using Readily Accessible Data to Assess Emerging Road Salt Contamination to Streams, Environmental Polllution, vol. 159, p. 1257-1265.

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**EXPERT TESTIMONY IN PAST FIVE YEARS (Trial and Adjucatory Hearings)**

State of New York, County of Cayuga, Supreme Court, Doris Baity, et. al. Plaintiffs versus General Electric, Auburn NY, April-May 2012. Contact:

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Appendix B

# Appendix B

## Documents Reviewed by IES

| Documents provided by Langrock, Sperry & Wool LLP |
|---|
| 1990-06-08 AP-90-007 Permit Conditions |
| 1990-05-01 AP-90-007 Technical Analysis of an Air Contaminant Source |
| 1992-08-07 AP-90-007x Denial Letter |
| 1993-06-27 AP-90-007a Permit Conditions |
| 1993-05-25 AP-90-007a Technical Analysis of an Air Contaminant Source |
| 1996-03-19 AP-90-007b Amended Air Pollution Control Permit |
| 1996-03-18 AP-90-007b Technical Analysis of an Air Contaminant Source |
| 1996-04-10 Chemfab Application for Air Pollution Control Permit |
| 1996-05-28 AP-90-007c Amended Air Pollution Control Permit |
| 1998-11-24 AP-90-007d Air Pollution Control Permit to Construct |
| 1998-11-24 AP-90-007d Technical Analysis of an Air Contaminant Source for a Permit to Construct |
| 2000-08-29 AP-90-007e Air Pollution Control Permit to Construct |
| 2000-08-29 AP-90-007e Technical Analysis of an Air Contaminant Source for a Permit to Construct |
| 1976-07-08 Invoice Newton Assoc. |
| 1977-11-15 Invoice Renovations |
| 1977-12-16 Invoice Renovations #2 |
| 1977-1978 Invoice Additions |
| 1977-1980 Invoices |
| 1978-01-03 Ltr Invoice Approval |
| 1978-02-23 Ltr Abatar Tower 4 Rcvd |
| 1978-03-01 Ltr Plumbing Wash Sink |
| 1978-04-25 Ltr of Progress |
| 1978-04-27 Ltr State Wash Sink App (Land use Permit) |
| 1978-05-05 Ltr of Inspection |
| 1978-06-27 Ltr Inspection Report |
| 1978-10-18 Air Pollution Letter |
| 1978-1979 Invoice Additions |
| 1979-09-07 Ltr Price of Fluon PTFE |
| 1979-1980 3rd qtr Invoices |
| 1980-01-18 Water Supply Study 005 |
| 1980-05-21 Memo Smoke |
| 1980-05-22 Invoices |
| 1981-04-22 Ltr Evaluation of Odor |
| 1982-03-09 Memo Toxic Hazard |
| 1982-05-06 Tower Report |
| 1984 Chemfab Odor Survey |

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|---|
| 1984-10-16 Notice of Decision |
| 1985-02-28 Memo Odors in NB |
| 1985-08-23 Lightweight Tower List |
| 1985-08-23 Tower Design Plans |
| 1985-08-23 Tower Design Questions |
| 1985-11-26 APC memo re complaints and corrective actions |
| 1985-12-24 Memo Head Count |
| 1986-01-12 Ltr Overdue Invoice |
| 1986-01-13 Memo Staff Meeting |
| 1986-05-15 Ltr Comments Received |
| 1986-7-17 Complaint re vents in wall |
| 1986-09-26 Handwritten Notes |
| 1986-10-09 Ltr Meeting 10.17 |
| 1986-10-15 NBVT Problem |
| 1986-10-22 Ltr Odor Testing |
| 1986-10-23 Chemfab to APCD re testing |
| 1986-10-23 Fax Env1 Supplement |
| 1986-10-27 Chemfab Supplemental Phase I Test Report |
| 1986-10-30 Chemfab roof penetrations |
| 1986-11-3 Chemfab odor reduction measures |
| 1986-11-13 Ltr Visit to Alliance |
| 1986-12-17 Solvents used by other companies in building |
| 1986-12-23 Sam's Memo |
| 1986-12-29 process materials |
| 1987-01-13 Action Status Report |
| 1987-01-28 #2 |
| 1987-04-14 Fax Cover |
| 1987-04-14 Memo Hazard Awareness |
| 1987-06-03 Memo Alliance Report |
| 1987-06-19 Chemfab Odor Impact Evaluation |
| 1987-06-19 Chemfab VOC Test Report |
| 1987-07-23 Ltr Overdue Invoice |
| 1987-7-20 APCD to Chemfab problems with testing |
| 1987-8-18 APCD memo questions re testing |
| 1987-8-26 Odor related to processes |
| 1987-09-02 Fax Abator Data |
| 1987-09-23 Ltr Overdue Invoice |
| 1987-9-9 Chemfab to APCD abator and process info |
| 1987-9-9 Chemfab to APCD emission points |
| 1987-12-30 APCD to Chemfab Modeling |
| 1988-1-20 APCD toxic air contaminant study |
| 1988-02-25 Memo Emissions Data |
| 1988-11-2 Chemfab odor reduction plan |
| 1990-1-19 Chemfab status report |
| 1992-05-04 Chemfab VOC Test Report |
| 1992-5-1 Chemfab variance request for new tower |

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|---|
| 1992-6-19 Chemfab variance request with emissions data |
| 1992-8-7 APCD Permit denial basis |
| 1992-9-16 tower replacement |
| 1993-5-3 Chemfab air permit application |
| 1993-6-24 Chemfab process changes |
| 1995-12-28 Chemfab no abater proposal |
| 1997-1-23 Chemfab abator situation |
| 1997-1-23 Chemfab permit application |
| 1997-3-19 APCD memo re PTFE fumes |
| 1997-3-21 NY Letter re PFOA from Taconics |
| 1997-06-05 Chemfab odor complaint crono memo exhibitA |
| 1997-10-6 Chemfab variance granted |
| 1997-12-5 Chemfab process changes |
| 1998-2-12 Inspection with visible emissions violations |
| 1998-08-26 Chemfab TowerP Test Report |
| 1998-08-31 Chemfab TowersAP Test Report |
| 1998-09-17 Chemfab Test Review Memo |
| 1998-9-17 APCD Memo re stack testing |
| 1998-10-2 Emissions from heat cleaning operation |
| 1998-11-16 Chemfab process changes |
| 1999-1-6 Chemfab fire in stack |
| 1999-1-8 APCD fire in stack |
| 1999-2-19 APCD inspection fire on roof, liquid on roof |
| 1999-4-13 APCD inspection with smoke |
| 1999-4-23 APCD review of air toxics testing |
| 1999-5-11 process changes |
| 1999-8-30 Chemfab summary of stack tests |
| 1999-09-03 Chemfab TowerR Test Report |
| 1999-09-14 Chemfab Tower R test review |
| 1999-9-20 APCD review of stack testing mentions PFOA |
| 1999-11-3 APCD inspection--roof deposits |
| 1999-11-15 process changes |
| 2000-1-17 Chemfab tower and abater data |
| 2000-05-05 Chemfab inspection |
| 2000-9-5 Chemfab history of abaters |
| 2000-12-5 Chemfabs emissions tests catalysts |
| 2001 APCD facility fact sheet |
| 2002-3-15 APCD inspection |
| 2002-3-15 APCD termination of permits |
| Charter Objectives |
| Company Dept. Flow Chart |
| John Williams II |
| Memo Protective Eye Wear |
| Polymer Fume Fever |
| Question for 2nd Generation Tower |
| Source Test of Glass-Fiber Teflon |

| Summary of Results |
|---|
| 1974-1975 Machine & Equipment Invoices |
| 1977-09-07 Pollution Abatement Coating Tower Exhaust |
| 1978-01-03 Ltr Invoice Approval Hand Written |
| 1978-02-21 Ltr Senate Labor Reform Act |
| 1978-05-31 Ltr Project almost complete |
| 1978-06-02 Hand Wrtn Ltr Cert Date Intrm Rpt |
| 1978-06-02 Ltr Cert Date Interium Report |
| 1979-12-21 Ltr Teflon Coating Food Process |
| 1981-11-03 Air Pollution Control Regulations |
| 1984 General Ledger Fiscal Backups |
| 1984-09-24 Memo Meeting Vermont Environmental |
| 1984-09-27 Ltr Proposed Modifications |
| 1984-09-28 Approval of Invoice Fume Capture Odor Abatement |
| 1984-09-28 Memo Hazardous Air Contaminent Guidelines |
| 1984-10-16 Notice of Public Hearing |
| 1985-06-14 Memo AIV Emittant Survey |
| 1985-06-26 Memo Site Employee Summary Appendix |
| 1985-07-17 Minutes of Decomposition |
| 1985-08-21 Ltr Price Breakdown of Quotation |
| 1985-09-09 Ltr Mid-Weight Tower Design |
| 1985-09-09 Ltr Stack Sampling Meeting |
| 1985-09-10 Ltr Lightweight Tower Design Group |
| 1985-09-19 Ltr Safety Committee Meeting |
| 1985-12-27 Memo Site Employee Summary |
| 1986-01-24 Ltr request explaination |
| 1986-01-29 Ltr Meeting Test Results |
| 1986-01-29 Ltr Organic Compounds Omitted (143) |
| 1986-01-29 Ltr Sample Collection Explination |
| 1986-01-29 Ltr Sample collection notes |
| 1986-07-28 Ltr Materials Source Testing |
| 1986-08-27 Telephone Record Environment One Report |
| 1986-09-22 Ltr Tlecon Jerry Di Vincenzo |
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| 1986-10-13 Telephone Record Adirondack Environmental |
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| aquifers near Bennington 2 |
| aquifers near Bennington |
| 3D perspective of N Benn |
| Surficial Thickness Blow up Bennington |
| Surficial Thickness Map of VT |
| N Bennington Bdrx Outcrop at red dots |

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| Quarries and Glacial Features |
| Wells Near Benn Overburden Thickness |
| Wells Near Benn Total Well Depth |
| Wells Near Benn Static Water |
| Private Wells Near N Bennington Vermont 04 2017 |
| Vermont ANR AERMOD MAP of Bennington_Wells_AERMOD_2016_12_02.jpg |
| Table of CT Male Soil Results |
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| possible other sources of PFOA fr VT web database |
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